the quality of the damask, all the other shades and gradations—the wavy, the motley, and the 'kirk narduban'—may be obtained." This watering, when examined by the naked eye, represents the macrostructure of the finished article and shows the way in which it has been mechanically treated.

The most remarkable quality of these high-carbon steels is their unusually high degree of malleability. Col. Belaiew shows that while the melting process and the slow rate of cooling are to some extent responsible for this, the real explanation is to be found in the microstructure of the finished article, which reveals the fact that the free cementite (hyper-eutectoid) is no longer present in the sharp, pike-like projections characteristic of the metal in the cake, but is in the form of small, rounded globules resolved at about 50 diameters' magnification, which appear like "milky ways." The main cause of the great malleability of damascene steel is the globulitic microstructure of the cementite produced by forging at a low temperature. This "spheroidising," which has been studied in other connections by Howe, occurs readily at temperatures rather below Ac_1 (730° C.), and is much facilitated by forging. All the Oriental writers, and especially Anossoff, insist on the importance of not exceeding a red heat during this operation; and the reason for this is now clear. This aspect of the results of Col. Belaiew's research has a most important lesson for the manufacturers and users of tool-steel. The low-temperature forging below A_1 is a process capable of manifold application to high-carbon steels, which, without it, are too brittle. It is scarcely too much to say that there are many cases where carbon tool-steel treated in this way could be used instead of the much more expensive alloy steels.

H. C. H. C.

NOTES.

Sir William Crookes attained the age of eighty-six on Monday, June 17, and received the congratulations of many friends. He bears the burden of his years lightly, and is still actively engaged in research. This spirit of inquiry has been maintained throughout his life, and we trust that strength will be given to Sir William for some time yet to enable him to continue to satisfy it.

We regret to announce the death at forty-seven years of age of Dr. E. A. Newell Arber, demonstrator in palæobotany at the University of Cambridge since 1899.

Following the precedent of last year, the Conference of Delegates of Corresponding Societies of the British Association will this year be held in London in the rooms of the Geological Society on Thursday, July 4. Dr. F. A. Bather has been nominated as president, and a discussion will be invited upon his address, which will be entitled "The Contribution of Local Societies to Adult Education." The question of afforestation will also be considered.

From a statement made by Sir Albert Stanley, President of the Board of Trade, in an address at Manchester on Friday last, June 14, it appears that the Government has decided to take certain further steps in support of the dyes industry. The matter was referred to in a note recently published in these columns (Nature, May 23), and it is satisfactory to find that, in addition to the control of imports by a system of licences and in order to further financial help to be given among smaller makers, a combination is to be arranged between the two great firms, British Dyes, Ltd., and Messrs. Levinstein, Ltd. The foreigner must be fought with his own weapons, and long ago in Germany it was recognised that mutual support and assistance contributed almost as much as, or perhaps more than, any other condition to the success of the dye-making firms. One of the first things which should now be done in this country is to prepare a general survey of the dye field, to ascertain which firms are best prepared to make particular classes of dyes and their necessary intermediates, to determine in what directions the home industry is weakest, and to pool the results of research. The relation of explosives to the dye-making business must be steadily borne in mind, and the "combine" which is contemplated between Nobel's and other explosive manufacturing concerns is a feature of the situation from which results of the utmost importance may ensue to the dyes industry.

The death is announced, on June 9, at sixty years of age, of Mr. J. H. Lace, C.I.E., formerly conservator of forests, Burma.

The Toronto correspondent of the *Times* reports that the Honorary Advisory Council for Scientific Research, which has been studying measures to foster the scientific development of Canadian industries, proposes the establishment of a research institute for the Dominion.

The third Gustave Canet lecture of the Junior Institution of Engineers will be given on Monday next, June 24, at the Institution of Civil Engineers by Sir Wilfrid Stokes, who will take as his subject "The Stokes Gun." Free tickets of admission may be obtained from the secretary of the Junior Institution of Engineers, 39 Victoria Street, S.W.1.

The Royal Academy of Science of Turin has announced, we learn from *Science*, a prize of 26,000 lire, to be awarded for the most remarkable and most celebrated work on any of the physical sciences published in the four years ending December 31 next. The prize fund is a bequest from Senator T. Vallauri. Competition is open to Italian and foreign men of science, and the term "physical sciences" is to be taken in the broadest sense.

We learn from *Science* that the Boston Society of Natural History has awarded the Walker grand honorary prize, which this year takes the form of a one-thousand-dollar Liberty bond, to Prof. Jacques Loeb, of the Rockefeller Institute, New York, in recognition of his many published works covering a wide range of inquiry into the basic concepts of natural history. The Walker grand prize is awarded every five years, under the terms of the will of the late William Johnson Walker, "for such scientific investigation or discovery in natural history," first made known and published in the United States, as the council of the society shall deem deserving thereof.

The President of the Board of Agriculture and Fisheries has appointed a Committee to consider and report how Government stores which may become available after the close of the war can best be utilised for agricultural and horticultural purposes, and what methods of purchase by farmers and others should be adopted. The members of the Committee are:—Earl Grey, Mr. J. S. Gibbons, Mr. W. R. Hopkinson, Prof. F. Keeble, Mr. Douglas Newton, Mr. J. W. B. Pease, Capt. Sir Beville Stanier, Bart., Mr. R. Stephenson, Mr. N. Walker, and Major the Hon. E. F. L. Wood. The secretary of the Committee is Mr. E. G. Haygarth Brown, of the Board of Agriculture and Fisheries, 4 Whitehall Place, S.W.1.

The possibility of exploration in the Himalaya by aeroplanes is discussed by Dr. A. M. Kellas in the *Geographical Journal* for June (vol. li., No. 6). Dr. Kellas believes that there should be no physiological difficulty in flying for some time at an elevation of 25,000 ft. provided oxygen and a suitable apparatus for utilising it were carried. October and November, or, better still, September and May, he considers the best months as regards climatic conditions, but the problem of flying through cloud would have to be solved. Another great difficulty would be landing and starting at great altitudes. The snow at such altitudes is either powdery, or soft beneath a thin hard layer, and would therefore require either rolling or compressing with a heavy stamp to make it firm enough to give the necessary resistance to a moving plane. Dr. Kellas thinks the airmen would have to be acclimatised to high altitudes by many trial flights. In the discussion which followed the paper a number of airmen took part, and their general consensus of opinion seemed to be opposed to the project.

It was reported in the *Times* of June 12 that British iron and steel manufacturers have taken an important step for securing the future position of their industry, and that they have agreed to form a national council on trade policy. This council is to be representative not only of the iron and steel capitalists, but probably also of the employees. Undoubtedly it would be wise to constitute the new body on this basis, and it would afford another illustration of the effectiveness of the alliance between employers and employed which is coming to be one of the most important results of the war in this country. The function of the council will be to obtain an assured supply of the raw materials of the industry and a proper organisation with regard to production and export. Such a policy has much to commend it. The German iron and steel industry was organised for this purpose for many years before the war, but there was no place for labour in it. A representative conference of masters and men is also said to have agreed to the establishment of a second body, viz. an industrial council to deal with all labour questions in every branch of the iron and steel trade.

By the death on June 11 of Mr. R. Hooper Pearson, at the age of fifty-two years, horticulture has lost one of its most earnest, capable workers. As managing editor of the *Gardeners' Chronicle* Mr. Pearson exercised a steadying, wholesome influence on the science and practice of an industry, we might say a profession, which in recent years has grown in importance, and in consequence of the war is likely to become one of our principal food-producers. He was a great worker without ostentation. His knowledge of things appertaining to horticulture was exceptional. He had sound judgment and an open mind, and, what was of the greatest value in the position he held, kept steadily to the task of controlling and guiding the art of cultivation along the path that leads to improvement. To those who did not know him intimately he was likely to appear lacking in "push" and "vim," but his habit was to sift and weigh before coming to a decision. This was evident in the journal which he managed with such success. He planned and edited a series of popular handbooks known as "Present-day Gardening," and was the author of the useful "Book of Garden Pests." Mr. Pearson's best work, however, was more personal than books, and his hand will be missed in many channels where he was wont to serve disinterestedly.

The recently issued annual report of the Decimal Association shows that considerable progress was made during the past year in the movement for the adoption of a decimal coinage and the metric system of weights and measures. The report of the Government Committee on Commercial and Industrial Policy is referred to, and, in explanation of the fact that it does not favour any immediate change, it is pointed out that the Committee appears to have been led to this decision by its anticipation of the exceptional difficulties with which trade will be faced during the period immediately following the war. In a leaflet entitled "Great Britain's Interest in the Metric System of Weights and Measures," which accompanies the association's report, it is maintained that increased competition from our foreign rivals after the war will necessitate the organisation and development of our export trade, and demand the elimination of all hampering influences such as our present weights and measures. The suggestion is put forward that during the transition period it would not be unreasonable for the Government to bear the cost of the reform in certain cases; for instance, by allowing firms to retain out of the amount they would otherwise pay as excess profits a sufficient sum to recoup them for the charges they incur owing to the change.

After the marked failure of wheat all over the world last year, it is pleasant to be able to record that this year's crop promises to be good. According to a leaflet issued by the International Institute of Agriculture, the Argentine Government's estimate of the 1917–18 yield of wheat in the Argentine is 211·3 per cent. higher than last year's crop and 35·8 per cent. higher than the average for the five years 1911–16. New Zealand has issued an amended estimate of the wheat crop in that country, showing an increase of 24·6 per cent. on the 1916–17 yield, but a decrease of 2 per cent. on the five-year average. The total yields of wheat for the southern hemisphere (Argentina, Uruguay, Union of South Africa, Australia, and New Zealand) are estimated at 55·4 per cent. above last year's crop and 34·3 per cent. above the average yield for the five years 1911–16. The total crop of oats in Argentina and New Zealand for 1917–18 is estimated at 123·1 per cent. above last year's crop and 6·5 per cent. above the five-year average. As regards the northern hemisphere, the agricultural situation was an average one in Spain at the beginning of April; in France the weather is generally favourable for the growing crops and for spring sowing. In Great Britain the weather is favourable for all crops, while in Ireland the condition of crops is considered quite satisfactory. It may be stated in summary that on April 1 the condition of crops in the northern hemisphere was excellent in Ireland, good in Great Britain, France, and the United States, and average in Spain, Italy, Switzerland, and Morocco.

We have recently received a copy of the first number of *Helvetica Chimica Acta,* a new periodical devoted to the advancement of pure chemistry. Before 1914 the contributions to chemical literature emanating from Swiss laboratories had reached a total of, approximately, 380 per annum, but the Swiss Chemical Society has hitherto had no official organ for the publication of these. Whilst the hospitality of foreign scientific journals is duly acknowledged, and notwithstanding that there has been some hesitation about increasing the number of periodicals dealing with chemical questions, it is now considered necessary for the society to have its own journal—and all the more so since the present postal restrictions are hindering the publication in other countries of chemical researches carried out in Switzerland. In the new periodical it is proposed to give accounts of investigations made, both by chemists living in Switzerland and by Swiss chemists who are domiciled abroad, so that the result will represent, as it were, the whole national effort in this branch of scientific inquiry. Papers will be printed in any of the three national languages (French, German, Italian), and there will be six or eight issues a year. The first number opens well with a contribution by A. Werner on a new type of isomerism in cobalt compounds. This is followed by half a dozen other communications, some of which are excellent examples of research work in pure chemistry. The periodical is clearly printed and neatly produced. Chemists in this country will follow the new venture with sympathetic interest.

The announcement of the death on May 12 of Dr. R. G. Hebb brought a sense of personal loss to a wide circle of scientific colleagues and friends, felt with particular keenness by the fellows of the Royal Microscopical Society, to whom Dr. Hebb had endeared himself by his tact and geniality, no less than by his erudition and intimate acquaintance with things microscopical during the thirty-three years he had been connected with the society. Dr. Hebb was the eldest son of the late John Hebb, of East Dulwich. A graduate in arts and medicine at Cambridge, King's College Hospital shared with the University in fostering that keenness in microscopy which occupied so large a share of his life's work. Pathology, both naked eye and microscopical, early claimed his energies, and he was undoubtedly seen at his best in the post-mortem room or laboratory; but, at the same time, he was a sound clinical teacher, and made his mark in the out-patient department and in the wards of Westminster Hospital, the staff of which he joined in 1888, and where for many years he held the dual posts of physician and physician pathologist. His association with the Royal Microscopical Society was long and intimate. In 1855 Mr. (now Sir) Frank Crisp, at that time its secretary, enlisted his services on the staff of the society's Journal, and from then onwards Dr. Hebb was a regular contributor to the pages of the Journal. He was elected an ordinary fellow of the society in November, 1885, and appointed to the council a few years later. In 1902, on the death of Mr. A. W. Bennett, Dr. Hebb succeeded to the editorship of the society's Journal (the first number for which he was solely responsible being that for April, 1902), a post he continued to hold to the time of his death. In 1892 he became co-secretary with Dallinger, from which time until 1911 he was virtually responsible for the conduct of the society's affairs. After the resignation of Dallinger in 1907, Dr. Hebb became the senior secretary, and had as associate secretaries, first J. W. Gordon, and afterwards F. Shillington Scales. In 1911 he resigned the post of secretary and was elected a vice-president. During the fourteen years he held office Dr. Hebb proved himself an ideal secretary, and the society, which has lost a devoted officer, fully realises the debt it owes to his exertions.

Though Benjamin Franklin at the beginning of the War of Independence seriously considered the possibility of arming the American troops with the longbow, as a cheaper and more effective weapon than the flintlock musket, archery among the Indian tribes is nearly a lost art since the introduction of the rifle. There is little evidence to show how these tribes made and used the bow and arrow. Mr. S. T. Pope induced the last survivor, Ishi, of the Deer Creek Indians of North-Central California, to live at the University of California from 1911 to 1916, and from him a mass of information on the subject was obtained, a summary of which has been published in vol. xiii., No. 3, of the University Publications in American Archæology and Ethnology. The process of making bows and arrows is elaborately described. Ishi's greatest flight-shot was 185 yards, which contrasts badly with that of Ingo Simon in France in 1914, with a very old Turkish composite bow, of 459 yards. The greatest recorded flight with the English longbow was made by I. Rawlins in 1794, a distance of 360 yards. The best American flight-shot is 290 yards, done by L. W. Maxson in 1891.

The Carnegie Institution of Washington has issued an elaborate monograph by Mr. W. Churchill on "Club Types of Nuclear Polynesia." By "Nuclear" Polynesia, a term proposed by the writer, he means Samoa, as the "nucleus," with Nīnā, Tonga, and Viti on the perimeter. He divides the clubs of this region into various types—the billet, rootstock, missile, pandanus, axe-bit, lipped, mace, coconut-stalk, and others. In each section is provided a full series of measurements and descriptions, with details of specimens in American and other collections. In previous volumes the author has discussed the linguistic evidence, and the present investigation corroborates the theories already arrived at. "In these wooden artifacts of Nuclear Polynesia, highly evolved in form to correspond with needs not only utilitarian, but even vital in their necessity, most remarkably specialised in ornament, there are found with equal clarity the memorials of such transit and sojourn of the peoples of the Nuclear Polynesia race through and in various parts of Melanesia as has already been established through the study of the many languages of the two Pacific areas."

In the Bulletin of Entomological Research (vol. viii., parts 3–4, 1918) there is a noteworthy paper by Dr. J. J. Simpson on "The Bionomics of Tsetse-flies in the Gold Coast." By marking a large number of flies and liberating them at various distances from the river near which they had been captured it was ascertained that a few returned from a point four miles away, but no large proportion from more than two miles away. As none were found farther from the river than their place of liberation, it seems that these insects are constantly attracted by water. Mr. H. Tetley contributes a paper of value on the mouth-parts of *Pangonia longirostris*, pointing out some marked secondary sexual differences, and drawing comparisons with corresponding structures in other Tabanidæ. It is doubtful if the minute lobe of the maxilla, described by Mr. Tetley as the lacinia, really represents that element of the typical appendage.

In an interesting memoir on the early development of *Didelphys aurita* (*Quarterly Journal of Microscopical Science*, vol. lxiii., part 1), Prof. J. P. Hill points out a fundamental distinction between the blastocyst of the marsupials (Didelphia) and that of the higher mammals (Monodelphia). In the former the process of segmentation gives rise at once to a hollow blastosphere, the wall of which is composed of a single layer of cells, differentiated into formative and non-formative polar areas. The formative area furnishes both ectoderm and entoderm of the blastocyst; the non-formative is the trophoblastic layer. In the Monodelphia, on the other hand, as is well known, the formative cells always form an inner cell-mass enclosed by the trophoblast. The Ornithodelphia (Monotremata) agree with the marsupials in the arrangement of the formative and non-formative areas, and for the condition exhibited by these two groups Prof. Hill suggests the term "Phanerotypy," the term "Cryptotypy" being proposed for the condition met with in the higher mammals. Precision in terminology is much to be desired, and in this connection we may perhaps point out, without being hypercritical, that the author speaks of four-celled and eight-celled *eggs*. Surely such stages can scarcely be called eggs. Why not call them embryos?

THERE is no fact with which medical men are more familiar than that the nerve-tracts which connect the brain and body are crossed, the right half of the body being united to the left hemisphere of the cerebrum and the left half to the right hemisphere. In 1907 Prof. A. Francis Dixon, Trinity College, Dublin, sought to explain the crossed arrangement by supposing that it was a result of the primary connection between the right halves of the retinæ with the right hemisphere of the cerebrum. The right halves of the retinæ receive rays coming from the left field of vision—the field in which the left half of the body is situated. Prof. Dixon pointed out that there is a manifest functional advantage in having the part of the brain which controls the movements of a limb situated near the cerebral area which receives the visual field in which the limb is situated. To secure that end, the nerve-paths have to be crossed, so that the hemisphere which receives the left visual field will also control the left half of the body. In the Dublin *Journal of Medical Science* (March, 1918) Prof. Dixon has carried his explanation a stage further—an extension due to the discovery by Col. W. T. Lister and Lt.-Col. Gordon Holmes that the retinal picture is inverted in the visual cortex of the brain, the upper half of the field of vision falling on the lower half of the visual cortex. It is well known that the movements of the body are represented in an inverted order in the cortex of the brain, those for the mouth and face being placed lowest down, and those for the lower limb higher up. If the retinal connections are the circumstances which determine the distribution of cortical areas, as Prof. Dixon supposes, the visual fields being inverted in the cortex of the occipital lobes, then we should expect, just as we actually find to be the case, a corresponding inversion of the motor areas—the movements of those parts of the body which lie in the upper field of vision being lowest down on the surface of the brain, and those in the lower visual field highest up.

THE American fuel famine is discussed at length, in the *American Museum Journal* for February, by Prof. C. Berkey and Mr. C. van Hise. The shortage of coal, which is acute, and has demanded drastic legislation, is in no way due, they remark, to any precautionary measures engendered by fear of exhausting the mines, for careful estimates show that at the present rate of consumption, which is enormous, the mines of the United States will continue to yield for something like two thousand years. The scarcity is to be attributed entirely to the unprecedented demands to feed the multifarious industries dependent upon coal and the difficulties of transport. Labour and distribution, in short, are unable to keep pace with the demand. But Prof. Berkey is of opinion that the anthracite reserves are being depleted at a much faster rate than the bituminous coals, and will probably not last more than a hundred years. The rate of production of bituminous coals at the present time in the United States is about 600,000,000 tons per annum.

THE problems in the development of British Guiana, a somewhat neglected Possession, are discussed by Sir Walter Egerton in the Journal of the Royal Society of Arts for May 31 and June 7 (vol. lxvi., Nos. 3419 and 3420). Sanitation, drainage schemes, and improvement of the water supply are all required. These, as well as administrative reforms, are discussed by Sir Walter Egerton, but he lays most stress on questions of population and communication. Nearly 50 per cent. of the inhabitants are East Indians, and their numbers are increasing. The prosperity of the sugar industry rests on their labours. Chinese used to come in large numbers many years ago, and proved most useful, but the Chinese population is now small. Sir Walter Egerton insists that interference with the immigration of East Indian and Chinese of both sexes in equal numbers will prevent the due development of the colony. At present the cultivated area of British Guiana is more or less confined to a coastal strip of plains intersected with drainage and irrigation canals. This gives little scope for an increased white population. The interior of the colony, however, is largely rich savannah land, more healthy than the coast, and well adapted for cattle-ranching. There are also great possibilities in gold and diamond mining. These considerations emphasise the second great need of the colony—railway communication with the interior by a line from Georgetown to Rupununi savanna and the Brazilian frontier. At present the only route to the interior is by water, and it is not easy.

THE May issue (vol. ii., No. 5) of the quarterly Journal of the Society of Glass Technology contains an important article by Prof. Boswell on British supplies of potash-felspar. A good account is given of all the more important localities where potash felspar, orthoclase or microcline, is known to occur in quantities sufficient to warrant the assumption that it may prove to be of economic importance, the questions of purity of the material, quantity available, ease of access, and convenience of transport being all considered. The author holds definitely that felspar from all the known British localities requires to be hand-picked in order to obtain it in a state of purity sufficient to enable it to be used in glass or pottery manufacture or for the extraction of potash. There are practically seven groups of localities represented, namely, (1) Cornwall, (2) between Lochs Laxford and Inchard, (3) between Durness and Eireboll, (4) near Overscaig, Loch Shin, all the three last-named being situated in Sutherlandshire, (5) Belleek, on the borders of Co. Donegal and Co. Fermanagh, (6) Glenties, in Co. Donegal, and (7) Belmullet, in Co. Mayo. It would appear that the purest felspars are those of Cornwall and Belleek, the deposits being in both cases fairly accessible, but the quantities in both places appear to be limited. The other localities show much larger quantities of mineral, but their potash contents are decidedly lower, and the localities are for the most part inconveniently situated in respect of transport. The author does not appear to think that, as a source of potash, any of these felspar deposits is likely to be economically workable in normal times, but is apparently rather more sanguine as to the prospects of the best of these deposits as a source of supply to the glass and pottery industries.

G. VALLAURI, in *Elettrotecnica* for January 25 and February 5 last, discusses at some length the theory of the audion. Included in the article is a summary of the uses of vacuum tubes with three electrodes for radio-telegraphy, their properties and characteristic curves, approximate formulæ for these characteristics, the possibility of investigating the action of the audion as an intensifier and generator, the study of typical methods of connection, and the possibility of investigating the audion as a receiver and in the more complex cases in which it fulfils several functions at the same time.

W. BLOCK, in the *Central-Zeitung für Optik und Mechanik*, January 20, describes a method of photographing shells in flight by a kinematograph camera having a specially broad film. The film moves forward in jerks, the photographs being taken when it is stationary, through a rotating screen having thin slits cut in it. The length of exposure is varied by varying the width of the slits. Since, however, the time between the successive stationary positions of the film is too great in comparison with the rate of motion of the shell, numerous slits are cut in the screen, and several exposures are made on the same portion of the film so as to show the projectile in various stages of progression.

AN interesting product of cellulose distillation is described by M. J. Sarasin in the *Compte rendu de la Société de Physique* of Geneva (No. 1, 1918). When cellulose in the form of cotton was distilled under reduced pressure (12 to 15 mm.) a semi-crystalline distillate was obtained, which, after purification by crystallisation from hot water or from acetone, proved to be levoglucosane. This compound is not itself fermentable by yeast, but on hydrolysis with dilute sulphuric acid it is converted into α-glucose, which can be transformed into alcohol by fermentation. The interest of the observation lies in the possibility which it suggests of obtaining the glucose, and thence alcohol, by the distillation of cellulosic raw materials on an industrial scale.

Naturen, the Norwegian popular science monthly, contains in its April issue an illustrated account by J. F. Schroeter of Prof. Störmer's aurora-borealis expedition of 1913. The account is based on Prof. Störmer's own papers in *Terrestrial Magnetism* and his address to the Scandinavian Scientific Association, Christiania, in 1916. The observations of the auroræ were taken photographically from Bossekop and Store Korsnes, two stations in the North of Norway 27·5 kilometres apart; and they provide more than 2500 determinations of height which, in general, lie between 86 and 226 kilometres with a maximum number about 105 kilometres. The angular distances of the auroræ from the north magnetic pole of the earth lie between 20° and 25°, with a maximum frequency at about 23°. The following types of display are distinguished:—(*a*) Intense curtains, red below, greenish-yellow above; (*b*) faint curtains, green to greenish-grey; (*c*) arches; (*d*) faint zones; (*e*) isolated rays; (*f*) luminous areas; (*g*) coruscating bands; (*h*) coruscating areas. Although the theoretical examination of these observations is not yet complete, it seems likely that the corpuscular theory, according to which auroræ are due to electrically charged particles entering the earth's atmosphere and describing paths determined by the earth's magnetic field, will explain most of the known facts.

THE U.S. Bureau of Standards has issued a new edition of its publication on polarimetry, with special reference to its technical applications, more especially to saccharimetry and the refractometric examination of solids and liquids. The bulletin deals with the various polarising systems in use, and contains a description of the different polarisers and polariscopes which have been found to be generally applicable to practical requirements, and explains the best methods of their employment so as to secure uniformity and accuracy of results. It treats of the various sources of light to be used in connection with polarimetric work and the several pieces of subsidiary apparatus required, the control and regulation of temperature, the employment of thermostats, temperature correction, etc.—in fact, all the details to be followed in accurate testing work of the kind. It has been put together to serve the needs of the practical man; it is simply and concisely written, and its account of the fundamental principles upon which modern polarimetry is based, whilst sound and accurate, may be readily followed by any ordinarily intelligent reader. The present edition (the second) has been carefully revised, and a considerable amount of additional matter has been included in the appendix. The new material comprises ten tables, new Bureau of Standards Baumé scale for liquids heavier than water, a *résumé* of the work of the International Commission for uniform methods of sugar analysis, a special section on the polarisation of low-grade products, together with a statement of the amendments of the United States Treasury Department sugar regulations. The work is admirably printed and illustrated, and highly creditable to the Washington Government Printing Office. It is now ready for distribution at a price of 25 cents, and those interested may obtain a copy by addressing a request to the Bureau of Standards, Washington, D.C., U.S.A.

DISCUSSING the question of the organisation of chemical research in India, Sir Thomas Holland, president of the Indian Munitions Board, urges in an address given at Lahore that India must be independent not only industrially, but also to a large extent in regard to scientific research. India should have its own research workers carrying out investigations on the spot. The task of training the educated young men of India to qualify for research and technical work should be an essential part of the organisation of every scientific and technical department in that country. Because European beet-sugar has been able to compete successfully with Indian cane-sugar, and synthetic indigo has practically destroyed the Indian indigo industry, it has been generally assumed that tropical countries will not be able to hold their own against European and American competition; but what can be done in Europe under the (relative) disadvantages of a temperate climate could, the speaker argued, be done still more abundantly and successfully in India. It will, however, be necessary to bring the isolated chemists of India into one organisation, and an official scheme to this end had been mooted. At present only the fringe of the various great chemical problems in India has been touched. These include questions relating to agriculture, forest products, drugs, perfumes, dyes, and tanning; the manufacture of salt, sugar, alcohol, and explosives; saltpetre refining, mineralogy, and metallurgy. It is suggested that for administrative purposes researches on these matters might be centred in three groups: (*a*) Agricultural chemistry, with the chief laboratory at Pusa; (*b*) organic chemistry, with two principal laboratories at Dehra Dun and Bangalore; and (*c*) mineral chemistry, with the chief laboratory at Kalimati or Calcutta. The address is reported fully in the *Pioneer Mail* for January 18, and a detailed abstract appears in the Journal of the Society of Chemical Industry for April 15.